

SOUTH CAROLINA PUBLIC SERVICE COMMISSION
DOCKET NO. 2005-1-E
DIRECT TESTIMONY OF PROGRESS ENERGY CAROLINAS, INC.

WITNESS C.S. HINNANT

1 **Q. Mr. Hinnant, will you please state your full name, occupation, and address?**

2 **A. My name is C.S. (Scotty) Hinnant. I am Senior Vice President and Chief Nuclear**
3 **Officer. My business address is 412 South Wilmington Street, Raleigh, N.C.**

4 **Q. By whom are you employed and in what capacity?**

5 **A. I am employed by Progress Energy Carolinas, Inc.**

6 **Q. Please describe your duties as Senior Vice President and Chief Nuclear**
7 **Officer.**

8 **A. The Progress Energy nuclear fleet consists of 5 units located at 4 plants in the**
9 **Carolinas and Florida. The fleet's combined generating capability (summer**
10 **maximum dependable capacity) at year-end 2004 was 4,286 megawatts and the**
11 **fleet generated approximately 34.9 million megawatt-hours of energy in 2004. All**
12 **four site Vice Presidents report to me, along with the Vice President - Nuclear**
13 **Engineering and Services, the Manager - Performance Evaluation & Regulatory**
14 **Affairs, and the Manager - Nuclear Security. The four Carolina units under my**
15 **supervision which serve our customers in South Carolina are Brunswick Unit 1,**
16 **Brunswick Unit 2, Harris Unit 1, and Robinson Unit 2 which had a combined rated**
17 **capacity of 3,382 MW as of December 31, 2004. As a result of capital**
18 **improvements and modifications made during 2004, the Maximum Dependable**
19 **Capacity for the Carolina's units was increased to 3,448 MW.**

20 **Q. Please summarize briefly your educational background and experience.**

1 **A.** I graduated from North Carolina State University with a BS in Electrical
2 Engineering. I have 36 years of nuclear power plant design, construction
3 engineering, operation, and management experience with both pressurized water
4 and boiling water reactors. I have worked at 3 nuclear power plants in various
5 capacities, including, start-up and testing, maintenance manager, plant general
6 manager, director of site operations, and site vice president.

7 **Q.** **What is the purpose of your testimony here today?**

8 **A.** The purpose of my testimony is to review the performance of the Progress Energy
9 Carolinas (PEC) nuclear generating facilities during the period of January 1, 2004
10 through March 31, 2005 and the expected operating performance of the nuclear
11 units for the projected period July 1, 2005 to June 30, 2006.

12 **Q.** **Please provide the Commission with an overview of the performance of the**
13 **Company's nuclear units during the period under consideration?**

14 **A.** Our nuclear fleet achieved an unadjusted net capacity factor of 92.9% for the
15 calendar year 2004 with the Harris, Robinson, and Brunswick Plant posting
16 unadjusted net capacity factors of 88.7%, 92.1%, and 95.4% respectively. Our
17 nuclear fleet produced approximately 27.6 million MWH's of net generation in
18 2004. For the period January 1, 2004 through March 31, 2005 the nuclear fleet
19 achieved a capacity factor of 92.9%. Our nuclear units: Harris Unit 1, Brunswick
20 Unit 1, Brunswick Unit 2, and Robinson Unit 2 achieved capacity factors of 91.6%,
21 94.2%, 91.4%, and 94.8% respectively for the period January 1, 2004 through
22 March 31, 2005

1 **Q. Please discuss the refueling activities at your nuclear units during the period**
2 **January 1, 2004 through December 31, 2004.**

3 **A.** The Company refueled three of its nuclear units during 2004. Brunswick Unit 1
4 was taken off line on February 28, 2004 and returned to service on April 2, a
5 duration of approximately 34 days. This outage came at the end of a fuel cycle that
6 began on March 30, 2002. Brunswick Unit 1 achieved a capacity factor of 100.8%
7 for the fuel cycle leading up to the refueling outage. In addition to planned
8 refueling, inspections, and maintenance activities, the second phase of a two phase
9 power uprate project was conducted during this outage. Certain modifications were
10 implemented and certain plant equipment, such as feedwater heaters and main
11 transformers, were replaced with newer and better equipment. As a result of the
12 power uprate project, Brunswick Unit 1's Maximum Net Dependable Capacity was
13 increased from 872 MWe to 938 MWe on January 1, 2005.

14 Robinson Unit 2 was taken out of service on April 20, 2004 for a scheduled
15 refueling outage and returned to service on May 28, 2004 a duration of
16 approximately 39 days. This outage came at the end of a fuel cycle that began on
17 November 14, 2002. Robinson Unit 2 achieved a capacity factor of 104.1% for the
18 fuel cycle leading up to the refueling outage. In addition to replacement of
19 approximately one third of the core's fuel assemblies, specific outage activities
20 included inspection of the reactor vessel head; inspection of certain reactor vessel
21 instrumentation penetrations; repairs to the under-vessel instrumentation piping
22 supports; steam generator eddy current testing; and, work to facilitate replacement
23 of the reactor vessel head during the next scheduled refueling outage.

1 Harris Unit 1 unit began a refueling outage on October 15, 2004 and returned to
2 service on November 17, 2004 a duration of approximately 32 days. This outage
3 came at the end of a fuel cycle that began on May 20, 2003. Harris Unit 1 achieved
4 a capacity factor of 96.6% for the fuel cycle leading up to the refueling outage.
5 During this outage, refueling, required maintenance and inspections were
6 completed as planned. The outage was extended by about a week when outage
7 scope to resolve operability issues with the feedwater isolation valves was added to
8 the work to be completed during this outage. The unit was preparing to start-up
9 from the refueling outage when damage was discovered on the feedwater isolation
10 valves. These three valves are relatively new, so no maintenance had originally
11 been planned during the outage. The valves were repaired and returned to service.

12 **Q. Had Progress Energy taken reasonable precautions to prevent this type of**
13 **incident ?**

14 **A.** Yes. The valve vendor that PEC purchased these valves from had decades of
15 experience designing and manufacturing components for the nuclear industry.
16 Based on the vendor's long history of success, PEC had every reason to believe
17 that the design and manufacture of these components would be acceptable.
18 Further, PEC has a vendor over sight program that is considered to be among the
19 best in the country. At the time the valves were installed, detailed procedures and
20 inspection requirements were in place to both ensure that the installations were
21 accomplished properly as well as to preclude damage to the equipment during the
22 installation process. Subsequent to this incident, we have applied the wisdom of
23 hind sight to further enhance our procedures and safeguards.

1

2 **Q. How did the planned refueling outages impact the net capacity factors of the**
3 **nuclear fleet ?**

4 **A.** As I mentioned, the nuclear fleet achieved a net capacity factor of 92.9% in 2004
5 notwithstanding the fact that three of the Company's four nuclear units experienced
6 refueling outages. That means that the fleet's actual generation was only 7.1%
7 lower than it would have been had all of the units operated at their respective
8 maximum dependable capacity levels 24 hours per day, 7 days per week, all 366
9 days of 2004 .

10 **Q. During the review period January 1, 2005 through March 31, 2005, were any**
11 **of the units refueled ?**

12 **A.** Brunswick Unit 2 was taken off line at 2201 hours on March 4, 2005 and remained
13 off line through the end of the evaluation period for a scheduled refueling outage.
14 This outage came at the end of a fuel cycle that began on April 6, 2003. Brunswick
15 Unit 2 achieved a capacity factor of 101.6% for the fuel cycle leading up to the
16 refueling outage. In addition to planned refueling, inspections, and maintenance
17 activities, as we did with Unit 1, the second phase of a two phase power uprate
18 project is being conducted during this outage. Certain modifications are being
19 implemented and certain plant equipment, such as condensate and feedwater
20 pumps, and main transformers, are being replaced with newer and higher capacity
21 equipment.

22 **Q. During the period January 1, 2004 through December 31, 2004, did PEC's**
23 **nuclear units experience any scheduled other outages?**

1 **A.** Yes. Brunswick Unit 2 was taken out of service at 04:10 on May 29, 2004 to
2 service a drywell relief valve. Plant personnel noted and monitored increasing
3 leakage from the valve which is located in a difficult to access location within the
4 Unit 2 Drywell. Based on observations and in consideration of the upcoming
5 summer season, it was determined that the unit should be taken out of service so
6 the drywell valve could be repaired. The work was completed and the unit was
7 returned to service at 16:35 on May 31, a duration of only 60 hours and 25 minutes.
8 Harris Unit 1 was removed from service on May 6, 2004 when a circuit card in the
9 control rod drive circuitry failed and led to an automatic reactor shutdown. While
10 repair of this maintenance event was relatively straight forward and could have
11 been accomplished in about a day, the plant opted to keep the unit off line and to
12 enter a planned outage to investigate steam generator tube leaks. Specifically, the
13 plant had been monitoring a potential leak in the steam generator and had planned
14 to take a maintenance outage later in May to resolve the problem before the
15 approaching summer season. The outage opportunity created by the failed circuit
16 card allowed steam generator inspections and repairs slightly ahead of schedule.
17 With the unit off-line to repair the circuit card, the plant moved directly into the
18 planned outage work. Total outage time was minimized by completing the planned
19 outage work in conjunction with the repair of the circuit card. Further, steam
20 generator eddy current testing, which had been scheduled for the next refueling
21 outage, was accomplished during this outage eliminating the need for it to be
22 repeated during the refueling outage.

1 Brunswick Unit 1 was taken out of service on August 14, 2004 due to a loss of off-
2 site power. Winds from the remnants of Hurricane Charley caused an electrical
3 fault in the transmission system. The transmission system is designed to isolate the
4 plant from being affected by a malfunction in the electrical grid. The transmission
5 system event, combined with failure of a 230 KV switchyard breaker, resulted in
6 loss of off-site power to the unit. In accordance with the plant's technical
7 specifications, operators inserted a manual scram and shut down the unit. Unit 2
8 was not affected by the event. Following the manual shut down, plant systems
9 were inspected and reset. Additionally, the outage opportunity was used to perform
10 required inspections and maintenance including inspection of the drywell to torus
11 vacuum breakers and repair of the neutron instrumentation. Outage activities were
12 completed and the unit was returned to service.

13 Brunswick Unit 2 was taken out of service on July 29, 2004, to service a drywell
14 safety relief valve (vacuum breaker) that had been declared inoperable. One of ten
15 vacuum breakers that regulate pressure within the primary containment structure
16 could not be confirmed to be operating properly. Repairs were made to the vacuum
17 breaker. Additionally, other maintenance was performed during this outage
18 opportunity and testing that had been scheduled for a down power period during
19 the last weekend of July was accomplished while the unit was off-line. Robinson

20 Unit 2 was taken out of service on October 13, 2004 due to packing leakage from a
21 valve inside the Containment Building (RC-525, Pressurizer Spray Bypass Valve).
22 The leak rate was approximately 5.5 gallons per minute, well within operational
23 and safety limits. The plant was taken off line and the reactor shut down using

1 normal operating procedures. Following successful repair of RC-525 and
2 subsequent clean-up activities, a normal plant startup was performed and the unit
3 returned to service on October 14, 2004. The total duration of the forced outage
4 was 47 hours 19 minutes. Due to the short duration of this outage, no additional
5 work was performed that would impact future outage scope.

6 **Q. Were there any non-refueling outages during the period January 1, 2005**
7 **through March 31, 2005 ?**

8 **A.** No.

9 **Q. How does PEC's nuclear operations compare with the nuclear industry ?**

10 **A.** PEC continues to be a leader within the nuclear industry. For the three years
11 ending on 12/31/2004, Progress Energy Carolinas' nuclear units achieved a net
12 capacity factor of 95.98% compared to the industry average of 90.8% for the same
13 period.

14 **Q. Beyond the Company's superior overall nuclear performance, can you cite**
15 **any additional ways the Company's nuclear fleet is proactively taking steps to**
16 **minimize fuel costs ?**

17 **A.** As I have already mentioned, our nuclear plants consistently deliver very high
18 capacity factors reducing the generation that is needed from higher cost fuels.
19 Further, our nuclear fleet has taken advantage of industry experience and improved
20 technology to reduce the duration of nuclear refueling outages. For the five year
21 period ending in 1999, the fleet's average refueling outage duration was 41.2 days.
22 For the five year period ending December 31, 2004, the average refueling outage
23 duration was 36.8 days indicating a 10% reduction in refueling duration. Finally, I

1 will note that power uprate projects have been implemented at all four of the
2 Company's units resulting in 274 additional megawatts of nuclear generating
3 capacity that benefits our customers by displacing reliance on the more expensive
4 coal, oil, and gas generation. And, as I mentioned earlier, the Company is also
5 pursuing an additional power uprate at Brunswick Unit 2 during the 2005 refueling
6 outage to further leverage the value of the nuclear fleet.

7 **Q.** Did the Company prudently operate its nuclear plants during the period January 1,
8 2004 through March 31, 2005?

9 **A.** Yes, this is evidenced by the fact that our performance greatly exceeded the
10 national average and as well as the standard adopted by the South Carolina General
11 Assembly in S.C. Code Ann. Section 58-27-865 which creates a rebuttable
12 presumption that a utility prudently operated its nuclear plants if the plants
13 achieved a capacity factor of 92.5% excluding reasonable outage time associated
14 with reasonable refueling, reasonable maintenance, reasonable repair, and
15 reasonable equipment replacement outages; the reasonable reduced power
16 generation experienced by nuclear units as they approach a refueling outage; the
17 reasonable reduced power generation experienced by nuclear units associated with
18 bringing a unit back to full power after an outage; Nuclear Regulatory
19 Commission required testing outages unless due to the unreasonable acts of the
20 utility; outages found by the Commission not to be within the reasonable control of
21 the utility; and acts of God. As mentioned earlier, PEC achieved a nuclear
22 capacity factor of 92.9% without excluding any outage time.

1 **Q.** Did the Company take all actions reasonably possible and implement procedures
2 reasonable calculated to prevent and/or avoid plant outages?

3 **A.** Yes. The Company's high capacity factor and short scheduled outage durations is
4 indicative of a well run nuclear system.

5 **Q.** **Please describe the projected performance of PEC's nuclear system for the**
6 **time period January 1, 2005 through December 31, 2005.**

7 **A.** Including the impact of planned refueling outages, I project that PEG's nuclear
8 units will achieve an average net capacity factor of 94.2% during this period.

9 **Q.** **What capacity factor do you project for the Carolina's nuclear fleet for the**
10 **period July 1, 2005 through June 30, 2006 ?**

11 **A.** I project that the nuclear fleet will achieve a capacity factor of 92.3% (based on
12 estimated MDC for Brunswick-2 at 927 MWs effective 1/1/2006) for the period
13 July 1, 2005 through June 30, 2006. During that time, refueling outages will be
14 conducted at Robinson-2, Brunswick-1, and Harris

15 **Q.** **Does this conclude your testimony?**

16 **A.** Yes.